

Turning Waste to Cash in Wisconsin 2014

October 24, 2014

Some issues with parking. For future conferences at WEI, let people know of the best parking options.

1. Intro with Mandy

- A. Amanda Bilek and Wes Arndt are on the phone.
- B. Thanks for everyone for coming, new and old members. Last meeting was an overview of CHP and IEE, this time we have specific project examples
- C. The end deliverable is the Wisconsin Action Plan with short and long-term goals.
- D. Other goal is to assist getting CHP projects started in WI, preferably using AD. SEO can provide assistance finding funding and connecting with knowledgeable engineers and other experts.
- E. The WPUI meeting on Jan 23 is an important upcoming meeting to speak with them about utility-related issues when it comes to IEE and CHP.
 - i. Any comments about what ways you might be able to contribute to the Jan WPUI meeting, please let Mandy and the SEO know!
- F. Working with Earl and Todd to put together an Industrial IEE and CHP workshop.

2. Roundtable!

- A. Gary Radloff – WEI, suggestion for WPUI the inds say that economics don't work because of the utility stance on lack of profit on IEE and CHP projects. So, what incentives for utilities could be put in to help IEE and CHP along.
- B. Art Harrington – Look at many players in energy in WI. The focus is talking about CHP esp in relation to the 111(d) rules. Focus on making sure CHP is part of the conversation about CO2 reduction. This group should be concerned about how to add value to the thermal component of the rules.
- C. Tamara Sondgeroth –
- D. Cory H – GE and Waukesha engines. Proj manager for smaller engines. Run all different types of fuels. Lots of experience with biogas application.
- E. Ryan – GE. Looking into where CHP is used in places sparingly in USA. CHP is difficult to pull off economically, but it's a great idea if you can make it work.
- F. Kathy H – Clean energy manu fund. Partnership with SEO with competitive process for projs that are IEE and reduction of waste products and other cost-effective energy reduction projs. Application ends in Dec. Targeting food processing ind, manus, etc.

- G. Ian A – Focus on IEE policy.
- H. Chris – Stevens Point WWTP. What does WWTP do with CHP. This is a very successful trial!
- I. Collin – Talk about new ammonia cooling system and how it has helped the efficiency of their facility.
- J. Preston – Oversee biz prog with FOE. And some research for FOE. Laying out research priorities for 2015.
- K. Joe K – WEC. Work on energy efficiency and CHP, and distributed gen, AD, energy recovery.
- L. Craig S – Large energy users program
- M. Chuck S – IEE, renewables, CHP.
- N. Janet – Work on utility programs and issues with WWTPs.
- O. Kevin – Personal interest on energy issues. DG experience, econ issues particularly. What besides utilities will be available to make the econ picture come together? Maybe there are other gov progs (P) could be an opp. *The utilities should help us to understand where DG helps and hurts. When, what, and where are renewables ideal?* With waste streams in the state, how should that waste be utilized? Elec? P reduction? Volume reduction? Thermal units? Do facilities, businesses, etc. have a backup for elec generation? Perhaps we need to wait for the new CO2 rules to come down from EPA.
- P. Amanda – working on CHP and IEE in MN. GPI facilitates a working group that focuses on IEE and works with the SEO MN with projs. Working on utilization of biogas and AD in MW.
- Q. Wes – EE prog coordinator for WPPI.
- R. Tom – USDOE for CHP award.

3. Chris L with Stevens Point WWTP.

- A. Now the superintendent of SP WWTP. Predecessor was the brains behind the current SP WWTP configuration.
- B. Bugs remove P (biological removal, no chem P removal).
- C. Treats 4.6MMgallons (3MMgallons per day).
- D. In WWTP they use AD for reduction of waste. Stabilizes biosolids and vector attraction. Hold waste at 95° for 15 days straight.
- E. Biogas is not NG! Biogas has 60% methane and the rest is CO2, and a mix of other elements and compounds (N, H2S). NG is 80-90% CH4.
- F. TIP: Operators and people inside the plant need to see the energy bills.
- G. Energy audit by FOE in 2003. ID places where energy efficiency could improve. WWTP folks rarely if ever see the utility bill. There was a request to track energy usage. Then, they set goals for reducing energy consumption (by 20%) to save money and be more env friendly. This meant turning down

- blowers and aeration components. There was also an evaluation of equipment to be replaced or upgraded.
- H. From 2002 to 2011, they decreased energy usage by 24% by making process changes and small equip changes. ?
 - I. Another idea was to become energy neutral. For a plant that size, it was deemed to be impossible. Elec costs were not in line for a reasonable ROI. How do we fill in the gap between plant use and plant capacity? There was a lot of capacity that wasn't being utilized.
 - J. In 2012, had an evaluation of the energy intensity of the plant. Needed to remove a lot of the impurities of the biogas (siloxane and others) in order to run gensets. The genset is the cheap part, but the gas scrubbing is the expensive part.
 - K. Microturbines require compression of gas on top of gas scrubbing. Went with 180kW MANN engine instead of microturbine.
 - L. HSW receiving was key! More than 2MMgallons per year. Dairy waste, FOGs (restaurants), Food waste (from as far as Chicago), Beer waste (3 different sources in the county). Generate \$35k annually on tipping fees.
 - M. Current proj. Going into a partnership with SP Brewery to install a storage tank at their facility to go into a pipe that comes directly into the WWTP. This makes the HSW receiving not as big of a deal.
 - N. Future plans. Become energy producer. Smoothing out the HSW supply. Produce a class A biosolid. Add to digestion capacity. Become a regional biosolids facility.
 - O. Obstacles: Data collection is necessary to make good determinations for future plans. How much gas is possible to produce in order to determine gen set size? This requires trial and error to see what the capacity of the digester is to produce gas. Always trying new things and looking for new HSW streams. Some ind materials are not feasible because of heavy metals (needs to be landfilled).
 - P. Proving the ROI. Received grant from FOE for \$225k and \$114k. System maintenance runs around \$19.5k.
 - Q. Utilizing biogas increases the responsibility for the workers and increases work. Changes from WWTP to Resource Recovery Facility. Positions have to be created just to manage HSW streams. Air permitting is a huge headache.
 - R. Total proj costs: \$1,677,406. There is a concern in the room that the payback (with FOE) is 15 years. Without FOE, the ROI was 17-18 years. With tipping fees, the ROI is likely right around 8-9 years.
 - S. Future of biogas utilization. Regionalization is very cost effective. Allow one regional facility to take in the AD waste to produce energy rather than the disbursal of waste resources. Managing competition is a central issue. Private

- vs. municipal issues make it difficult for munis to negotiate tipping fees and waste streams (private able to pay more money for the waste). Brokers are getting involved to trade 'stocks' in waste streams, trying to find the least-cost option for waste disposal.
- T. Is there opportunity for colocation of biz or industry to be ideally located near WWTP to minimize costs in the movement of the waste stream. WWTP has some room within the facility to grow/maneuver. There is vacant property within the vicinity.
 - U. Utility arrangement. Contract with WPS WWTP consumes the elec first, what's left is pushed onto the grid. One of the last locations to get the biogas tariff. Elec generation conversation started in 08 and in 11 is when the agreement was signed? Was there a possibility to bring in private investors to help with investment?
 - V. small WWTPs not using AD because it's a large investment and likely don't have enough HSW. So is it a good idea to centralize HSW to one location. Some of these techniques requires breaking the rules of AD. Flaring could turn into a very big concern in the near future. Costs of moving methane gas offsite are HUGE. Trucking and electrical costs for gas transport are not economical.
 - W. With the HSW coming in, what would help manage the mass influx? There is a lot of training for the operators on staff. There are some HSWs that cause AD to go sour, but there are tests that can be done on wastes before they go into the digesters. Probs are caused by overfeeding.
 - X. P removal. How much P is removed and how does that help with compliance with P rules. Coming in 7-8ppm P, going out it's .2ppm. Bugs take up the P, goes to sludge storage tanks, thickened. With new nutrient plans, land application is restricted. Need to add equip for P removal to get down to the goals of the new P rule. Surrounding facilities would pay WWTP to take in material to remove P.

4. Collin Dean – Meister Cheese Co.

- A. The reason for their project initially was that there was a need for expansion of the cheese cooler.
- B. After the permeate leaves the evaporator it goes into the crystallizer room. The old ammonia system wasn't cooling the crystals quick enough. This was a problem esp on hot days. Major costs for cheese recalls.
- C. With the cheese cooler, they added storage space. This allowed for a cooled loading dock which saved time and money.
- D. Added four new tables to the cheese make room. Customers have said they have the best cheese plant in the world!

- E. There is a lot of energy use in the block forming towers. Makes 40lbs blocks of cheese. Shape forming and packaging happens here. There used to be 14 employees to operate the machines, now there are 3 needed. Machine uses gravity rather than a press.
- F. Before bringing milk to pasteurizer, there is a filter to increase the milk to 14.5% solids.
- G. Ammonia cooling room/system. Meister was thinking about putting in Freon system or updating it. However, some customers were looking for a more consistent product (get rid of the caking issues). This led them to choose the more expensive energy efficient ammonia system was 500k more (than the Freon system) but they receive about 300k in annual energy savings. FOE was able to reduce the cost with an incentive. The incentives that were available made this upgrade a very easy decision to make. FOE gave \$197k. Without which they would have gone with the Freon system.
- H. Variable drive saves about 30% of energy costs vs. old system with constantly running machines. The compressor, chiller, and circulator are all in the same room.
- I. ROI is about 7.5 years for the whole project.
- J. Future projects with selling protein.
- K. Not many cheese plants have a similar set up with protein treatment as this Co does. Lactose is being used for formula around the world in a more robust way than in the past.
- L. There is enough milk supply that the plant can run 24/7.
- M. Didn't really have barriers...if didn't have focus on energy money would have been a barrier.

5. Craig Schepp - Leidos Industry Survey- "Energy Savings Assessments.

- A. Talking about the connection between FOE, WisconSEN, and the participant survey.
- B. FOE is a WI statewide prog for energy efficiency and renewable energy.
- C. The Business Incentive Prog. Small/Medium customers are for demand up to 1MW. Large energy users are customers greater than 1MW/month. These include pulp and paper, metals, plastics, food processors, etc.
- D. Some system candidates would be steam generators, turbines, heat exchangers, etc.
- E. Leidos helps with savings and payback calcs, experienced and credible expertise, provide financial incentives to bring down proj costs, etc.
- F. Incentive types:
 - i. Standard/prescriptive: vary by technology.
 - ii. Custom: formula-based incentives, usually very quick payback.

- iii. RFP: annual, targeted markets, stretch custom limits
- iv. Proj Assessment: 50% cost share, performance-based
- v. Special financing: limited to positive cash flow incentive
- G. There are 12 energy advisors around the State. And they all have specific customers that they can work with. Supported from FOE by tech support, connecting them with programing. They are also supported through development of energy management plans, onsite tech support, etc.
- H. 350 of 750 industrial customers in the state have participated. Almost all of the incentive amounts have been utilized. They have exceeded the goals on kWh, almost there on therms goal.
- I. FOE usually operates as a 1-2 year buy down on the ROI for customer projects.
- J. 7 large companies are in the SEM pilot. Designed to help them develop their KPIs. (Key Performance Indicator) Seeking more participants.
- K. In 2006, DOE started the State energy analysis (energy savings assessments). FOE agreed to pay for half of these assessments.
- L. FOE is surveying ESA recipients to identify whether projects have been completed, if not why, and to find out the barriers to project development and what could help overcome those barriers. Survey respondents should prioritize the different barriers. In other words, which are the most serious barriers to project implementation. Furthermore, which of these barriers can we actually do something about?
- M. The more assessment work that can be done to look at how much money is spent in a smaller amount of time with less effort, the better.

6. Subcommittee Breakouts:

- i. **IEE Subcommittee 1 – Develop a process improvement strategy to identify the right delivery channel for IEE projects between consultants and plan managers to ensure project progression/completion** John N, Tamara, Ian, Chris, Kathy, Craig, Wes

a. Market

- a. Customers
- b. Suppliers
 - i. Equipment
 - ii. Engineering / Consultant firms
- c. Utilities
- d. Focus
- e. Associations
- f. WMEP/WMOC/MWERC

g. UW IAC

- b. **Barriers** (*denotes work Focus on Energy is currently engaged in)
- a. Return on Investment *
 - b. Customer Awareness of ECMs / expertise / opportunities *
 - i. Other benefits
 - ii. Comprehensive
 - c. Priority / Competition
 - i. % of costs energy constitutes to a business
 - d. Risk
 - i. Savings *
 - ii. Production
 - iii. Business Markets
 - e. Time, Staff
 - f. Capital *
 - g. Just-in-time Need

c. **Potential Solutions**

- a. Shared EE person for municipalities or associations
- b. Company intern
- c. Recognition
 - i. Company
 - ii. Person
 - iii. Team - at different levels
- d. Case studies / success stories
 - i. customer presentations with association
- e. Staffing grant for company
 - i. Energy Advisor / Project Management - supplemented by or replaced by more in depth role for energy advisor
- f. CEO / President connection - with utilities?
- g. Supplier empowered incentives
- h. certification? (ie like BOC)
- i. Update educational information
- j. Utility recognition - teaming
- k. Green Tier (for EE)

- ii. **CHP Subcommittee 2 and 4 - (2) Resolve issues concerning trading instruments and foster exchanges with DNR, PSC, with an expert from California, and others who have had experience utilizing these**

markets to explain the process and resolve how AD developers in WI can make trading these instruments profitable; and (4) Review the findings of reports concerning the economic benefits of CHP for utilities to be completed before the January WPUI meeting. Kevin Vesperman, Joe Kramer, Kenny Johnson, Preston Schutt, Cory Honl, Janet Lynch-Eisenhut

- a. Try not to limit the focus to economic benefits to utilities when reviewing findings.
- b. How does the impact of tipping fees offset the buyback period? How to avoid a premium rate in the buyback period. What are the options for getting a better rate?
- c. What are the values of centralized, community, and regional digesters for high strength waste? Does this calculation change dramatically when looking at different regional scales? What are the economic or other values and how does this affect the multiple streams?
- d. Values that impact multiple concerns (e.g. phosphorus trading). Environmental, Economic Resource Management. DATCP data needs to be collected and reviewed to identify drivers.
- e. Consider what has been done successfully in other areas, Such as Germany.
- f. Good and bad issues in regards to avoiding tariffs
- g. Look at Baker Tilley for financial viability and mapping tool.
- h. Look at equipment manufacturers, like GE.
- i. Identify different projects and review configurations
- j. Leveraging internal infrastructure. Which facilities are under loaded Which high strength loads are most common Pretreatment of high strength loads (for those that are over loaded)
- k. Get a list of digester sites in Wisconsin

- i. Clint – Wastewater Treatment Plants
- ii. Joe – Agriculture sites

- l. Identify economic benefit streams
- m. Look into potential biogas locations
- n. Use of biogas for public fleet transportation (voids vehicle warranty)
- o. Conduct a review of relevant literature (existing studies/reports) EPA, DOE, Put on dropbox or acquire from Joe
- p. Renewable fuel standards and tariffs may influence biogas adoption as a fuel
- q. Utilities may have potential siting issues similar to issues with distributed generation
- r. Is there a place for CHP at utilities that are decommissioning coal plants?
- s. There are many issues with new VS existing plants
- t. Barriers to district systems VS high efficiency modular products (96% efficient furnaces)
- u. Look at existing systems and the potential for upgrades
- v. Should the State work on the trading of credits to make projects more economically viable? Could this apply to phosphorus? Note of caution: transaction cost of trading can get out of control

- iii. **IEE/CHP Subcommittee 1 and CHP Subcommittee 1 – (1) Develop the business case and a financing strategy for further IEE/CHP projects in Wisconsin. Possibly including Potential Studies; and (1) Develop a strategy to overcome regulatory barriers to CHP development and bring in experts who have been working on finding solutions, as well as develop a Permitting and Regulatory**

Cookbook to clarify the myriad requirements for AD system operation for perspective system operators/owners. Ryan, Gary, Amanda B, Bruce,

- a. Gary presented a Navigant study (Industrial Combined Heat and Power 1Q2014) summary that highlighted some key trends in industrial CHP.
 - i. Increased fuel switching to natural gas
 - ii. Retiring of coal plants due to age and tightening emissions restrictions
 - iii. Growing electricity demand outpacing supply (especially in developing countries)
 - iv. Increase in distributed alternative fuel production, such as biogas and landfill gas
 - v. Utilities targeting onsite power services (e.g. managing CHP) to offset declining revenue
- b. Bruce talked about generating value prop to the public when making business case. Should be easily monetized. *Need to work with the utilities and build a holistic model based on all benefits (CO2 avoided, phosphorus abatement).*
 - i. *Could utilities get credit for these types of benefits?*
- c. *Clean power plant rule. Can we help utilities make money and comply?*
 - i. 5 pieces of the clean air act coming down the line. Most notable is section 111 parent D. called the clean power plant should shut down 4? coal fired power plants over the next 30 years. Boiler MACT in 2016? Tailoring rule. Could affect large industrial users. In the next 5 years, anyone in violation of the clean air act could be in trouble, including industrial users. – how can CHP provide compliance options?
- d. *Need to have utilities beat up our models as they are developed so they have a chance of being realistic when fully presented. If they are allowed to help craft policy, they will come to the table with real data to help compare to the model. However, they are not present today, so need to figure out why not.*

- e. Amanda: Advanced portfolio standard – like a renewable portfolio standard, but could include energy saving technology such as non-renewable CHP. Could they carve out some of the renewable portfolio standard for renewable CHP?
- f. Ways to get utilities to the table:
 - i. Carrot -> we understand that they will be replacing more profitable (dirtier?) power plants with less profitable ones, so if they want to have a say in how to help mitigate risk in a more narrow margin market, they will want to be present.
 - ii. Stick -> Get large corporations in the area to tell utilities that they want reform.
 - iii. Utilities will be present for WPUI meeting in January. Could discuss then.
- g. Can we go after the thermal users (high gas users) and sources of ag waste statewide to identify where there is overlap to justify CHP installations?
- h. Third Party Ownership: Policies and regulations to allow 3rd party private co-investment with public investment, due to perceived conflict of interest. Much of existing policies don't pass litmus test and possibly should be challenged.
- i. Can we look into overlap of heat demands with CHP feedstock availability?
- j. Bruce: Get some policy studies done to allow groups (multiple utilities – gas, water, electric; 3rd parties) to come together to develop value props and implement strategies.
- k. Gary: Clean water fund a resource to help assist with some of these projects. Specifically related to waste water to CHP projects. However, these are very competitive and the data used to grant awards might need work based on assessment done years ago.